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The influence of DR match of blood donor and recipient on the formation of T- and B-cell antibodies and on renal allograft outcome

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It has been shown that patients transfused with one unit of blood mismatched for both HLA DR antigens have an increased rate of formation of cytotoxic leucocyte antibodies compared to patients who received blood which differs in only one DR antigen. In the same study it was found that DR sharing of the blood transfusion donor and patient improved results of kidney and heart transplantation. However, the data were mostly collected in a retrospective manner and came from various centres. Furthermore, no information was available on whether these antibodies were directed to B- or T-cells. Therefore, the influence of DR match of recipient and blood donor on the formation of T- and B-cell antibodies as well as on clinical course after kidney transplantation was studied prospectively in patients transplanted in one centre.

Key words: DR match – Blood donor and recipient – T- and B-cell antibodies – Kidney transplantation

Patients and methods

One unit of packed cells was given to 147 patients who had received neither a transfusion nor had been pregnant. Serum samples were collected at 2, 3 and 4 weeks. After 4 weeks, crossmatching was done with frozen cells from the blood transfusion donor and HLA typing of the blood transfusion donor was performed. When the crossmatch was negative (NIH), patients received another one or two units of blood ($n = 73$). Recently, this protocol was changed and patients received one unit of blood ($n = 74$). In the analysis only the results after one transfusion were included.

Crossmatches were performed according to the NIH and TCF techniques. DTT treatment was used to study the immunoglobulin class of the antibodies involved. All patients who received a renal allograft used cyclosporin-A and low dose prednisolone as immunosuppression. Antirejection treatment consisted of a 10 day course of rabbit ATG. Subsequent rejections were treated with 50–100 mg prednisolone on 3 alternate days. Rejection was diagnosed on clinical grounds and in most cases was confirmed by a biopsy.

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Results

After one transfusion only 3 patients formed T-cell antibodies, while 29 patients formed B-cell antibodies (Table 1). There was no significant influence of DR match of the blood transfusion donor and recipient on the formation of either T- or B-cell antibodies (Table 1). In 9 of 21 patients with B-cell antibodies, auto-B-cell antibodies could be detected as well. If only those patients who formed allo-antibodies were analyzed, a significant influence ($P < 0.02$) of DR match of the blood transfusion donor and recipient on the formation of B-cell antibodies was present (Table 2). So far, 38 patients who received one unit of blood were transplanted (Table 3). No influence of DR match of the blood donor and recipient was present during the clinical course. In both groups no grafts were lost in the first 6 months due to immunological reasons. Moreover, the percentage of patients who were rejection free was comparable in both groups.

Discussion

In our study, only the formation of B-cell antibodies was influenced by the DR match of the blood donor and recipient and not the formation of cytotoxic T-cell antibodies. Our study is not completely comparable with the study of Lagaay [1] in the sense that we studied prospectively the formation of donor specific antibodies, while Lagaay analyzed retrospectively data on the development of antibodies against a random donor panel (NIH). It is unlikely

Table 1. The formation of antibodies and DR mismatch of blood donor and recipient

DR-mismatch	N	T− B+	T+ B+	Auto
0	17	1 (6%)	0	1
1	61	10 (16%)	3	6
2	69	18 (26%)	0	2

P = NS

Table 2. The formation of allo-antibodies and DR mismatch of blood donor and recipient

DR-mismatch *N*		T− B+	T+ B+
0	17	0	0
1	61	4 (7%)	3
2	69	16 (23%)	0

$P < 0.02$

Table 3. Kidney graft outcome and DR match of blood donor and recipient

DR mismatch	1	2
N	20	18
% Graft survival ($^1/_2$ year)	75	100
Non-immunological graft loss	5	0
Immunological graft loss	0	0
% Without rejection treatment	67	72

that this difference explains the lack of accordance of both studies. It is more likely that the different results are due to a different interpretation of serological results. This assumption is supported by the fact that Lagaay reported a higher sensitization grade in her study than we and others have found.

We could not confirm the beneficial effect of DR matching of the blood transfusion donor and patient on the clinical course. One could argue that the group was too small; but the groups studied by Lagaay [1] were not large. She studied 63 renal patients transplanted at various centres, and 20 heart patients transplanted in one centre. There are, however, large differences between the two studies. Our renal patients were treated with cyclosporin and the renal patients of Lagaay received azathioprine and prednisone. Moreover, antirejection treatments differed some what. The matching procedure was completely different in both studies. Our patients received HLA A + B + DR matched kidneys, while in the study of Lagaay renal patients were selected on the basis of HLA A + B antigens and heart transplantations were not selected on the basis of either HLA loci.

Conclusion

After one transfusion, only 2 respectively 14% of renal patients formed allo-T and allo-B-cell antibodies. Only the formation of B-cell antibodies was influenced by the DR match of the blood transfusion donor and not the formation of T-cell antibodies. There was no significant influence of the DR match of the blood transfusion donor and patient on the clinical outcome of the kidney allograft.

References

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